optimistic account of the fire, and accompany it with a view of the Observatory buildings and house.

"It came at last. On Sunday morning, the 17th February, at 7.30 a.m., I was alarmed by the cry of fire, and at 8 o'clock I was looking at smoking ruins in the midst of my two armsful of salvage (which I took good care should include my last year's photographic records), receiving cards of condolence from high personages and presents from the neighbouring shop-keepers—like bottles of beer, boxes of eggs, and oranges—and all this while the fire engines were vigorously pumping. I saw that nothing more was to be saved, but before the flames were out, my colleague, Mr. C. D. West, set to work to take a series of snap-shots with his hand-camera. The results look like fogged plates, but they show amongst other things the effects of heat upon my big stone column. On Tuesday, I used some of the pieces as illustrations to a geological class as illustrative of the action of lava streams upon rocks they occasionally flow over. The President of the University, who very kindly had hurried from his house to see me and my ruins, had a new house ready for me before my own had done smoking, and I am now in it arranging furniture I have hired, sorting through heaps of charred paper, and getting ready to set up two new pendulums. These latter, if they work well, I hope to bring with their records to England, to show as a type of instrument which may be able to record movements which go round the globe and possibly through its interior. When earthquakes are recorded throughout Great Britain, it will not be necessary to always introduce a conversation with remarks about the weather.

"As nearly all the *Transactions* of the Seismological Society were packed up to go to Europe, a few that had middle places in the boxes may be saved, but I doubt if even out of 2500 copies I shall get more than two or three hundred. All my old earthquake books, some of which even dated from 1500 and 1600, but which were perhaps more curious than useful, seem to have gone.

"Instruments were fused or vapourised. Sixteen specially constructed clocks, which would turn drums once a day, once a week, or drive a band of paper for two years, together with seismographs and horizontal pendulums, self-recording thermometers and barometers, microscopes, and a museum of old and new contrivances, are now on the scrap heap. Until to-day, I felt that I had the observatory I intended to put up in England completely furnished, and I was proud of the furniture.

"The fire broke out in the midst of a pile of wood in an out-house, and this with a nice wind blowing on a Sunday morning when there was no one near to help.

"And now I have next to nothing—decorations, medals, diplomas, clothes, manuscripts, extending over twenty-five years, and everything else has gone to smoke; still it is not altogether a misfortune.

"Looked at in the right way, like an earthquake, a fire may after all be a blessing in disguise; but, of course, it is sometimes pretty well wrapped up.

"Dies iræ, dies illa,
Solvet saeclum in favilla."

TERRESTRIAL HELIUM?

I HAVE received the following letter and enclosure from Prof. Thorpe:—

"University of Glasgow, April 16.

"MY DEAR LOCKYER,—The enclosed extract from a letter just received from Cleve of Upsala may be of interest to you.

"Ever yours,
"T. E. THORPE."

"I have got from Mr. Crookes a letter in which he informs me that the gas in Cleveite contains the long-searched for helium.

"This letter arrived exactly the very day one of my pupils, Mr. Langlett, tried to get the gas of Cleveite in my laboratory. The gas given off from my mineral did not contain a trace of argon. The spectrum has been examined by Thalen, who found an exact coincidence of the line of the gas with the helium line and besides some others:—

Wave-length.	Intensity.
6677	half-strong
5875·9	strong: helium
5048	half-strong
5016	strong
4922	half-strong
4713·5	weaker

"I have sent a letter about it to Berthelot. If you like, you may communicate the result to the Chemical Society, Mr. Ramsay, Crookes, and other friends. . . . An experiment to determine the specific gravity did not give trustworthy results, but seems to indicate that it is a very light gas, still more heavy than hydrogen. Will this gas fill the gap between hydrogen and lithium? It will become very interesting to see. What makes me much curious is that our helium gas was free from argon, and that Mr. Ramsay's (according to *Comptes rendus*) did contain that curious stuff. Is there any relation between argon and helium, and are we facing a new epoch in chemistry?"

Although my results are not yet complete for publication, the foregoing communication makes it desirable that I should state at once that immediately on the publication of Prof. Ramsay's statement, by the kindness of Mr. L. Fletcher I was enabled to study the gases given off by Cleveite by heating in vacuo, a method I have used for metals and meteorites.

A very small quantity of Cleveite is all that is necessary to obtain a considerable volume of the new gas, which comes off associated with hydrogen.

I have now examined several tubes. I have found no argon lines; I have not found the lines, other than the yellow one, given by Crookes; but lines have been recorded near some of the wave-lengths given by Thalén, especially the one at 6677, near a line I discovered in the chromosphere in 1868. So far the sky has not been clear enough to enable me to determine by direct comparison with the chromosphere the position of the line in the yellow with great dispersion.

J. NORMAN LOCKYER.

NOTES.

IN honour of M. Berthelot, and as a demonstration of the power and progress of science in France, a banquet was held at Paris a few days ago. Nearly eight hundred guests were present, among them being M. Brisson, President of the Chamber of Deputies, and M. Poincaré, Minister of Public Instruction. Upon the invitation cards were printed the words: "Hommage à la science, source de l'affranchissement de la pensée." M. Poincaré made an eloquent speech in praise of the work done by the eminent Secretary of the Paris Academy of Sciences, and M. Berthelot, in his reply, dwelt, at some length, upon the beneficial influence of science on social and moral, as well as material, progress. Science, he said, had for its only guide the love of truth, and confidence in its final triumph. Proved under all circumstances, and strengthened every day by success, the scientific method had become the principal source of the moral and material progress of society. In fact, science was the source of all progress accomplished by the human race. Every one knew that, during this century science had conferred great benefits upon civilised peoples by the application of its results and laws to mechanical, chemical, and electrical industries. But M. Berthelot held that material progress was the least of the fruits of scientific work; he claimed for science the more extensive domains of the moral and social world, and vindicated the position taken up by him in his article on "Science et la Morale," which appeared in the *Revue de Paris*. The speech and the banquet may be taken as an effectual reply to those who question the benefits of scientific investigation in France.

ONLY last week, in announcing the publication of the fourth edition of Prof. James D. Dana's "Manual of Geology," we referred to the extraordinary activity of the author. We regret this week to have to record his death, at eighty-three years of age. Another eminent man of science who has just passed away is Prof. Lothar von Meyer, at the age of sixty-five.

REUTER'S correspondent at Toronto reports that the Provincial Legislative Assembly of Ontario has authorised a grant of 7500 dollars towards defraying the expenses of a meeting of the British Association for the Advancement of Science to be held in Toronto in 1897, should the Association accept the invitation to hold a meeting there.

MR. R. FITCH, whose name is especially well known among archæologists and geologists of Norfolk and Norwich, and who, three years ago, presented his collections to the Norwich Museum, and provided cases for them, has just died, at the advanced age of ninety-three.

JOHN ADAMS RYDER, Professor of Embryology at the University of Pennsylvania, died on March 26.

PROF. JAMES E. OLIVER, the mathematician, who was connected with the Cornell University faculty for twenty-five years, died at Ithaca, on March 27. He was born in Portland, Me., July 27, 1829. He graduated at Harvard in 1849, and received in the same year the appointment of assistant editor in the office of the American Nautical Almanac. He became in 1871 assistant professor of mathematics at Cornell University, and in 1873 was appointed to the chair as Professor. He was a member of the American Academy of Arts and Sciences, the American Philosophical Society, and the National Academy of Sciences.

A MONUMENT to the late Prof. Villemin, who added so much to the knowledge of the nature of tuberculosis, has just been unveiled at Val-de-Grace. A monumental souvenir of the late Prof. G. Pouchet was also unveiled a few days ago, at Pere-Lachaise.

THE Home Secretary, on the application of the East Riding County Council, has made an order prohibiting the taking or destroying of wild birds' eggs on the promontory of Spurn for a period of five years. Spurn Point is one of the chief places of deposit by sea birds of their eggs on the Yorkshire coast, and of late years there has been wanton destruction of both sea-gulls and their eggs.

A CORRESPONDENT informs us that a very bright meteor was seen at Tayport, N.B., at 10h. 4m. p.m., on Saturday, April 13. It started at a point a little to the east of Vega, and was moving almost directly towards Saturn. It was visible for about six seconds, and seemed to have a jerky motion. It was more brilliant than Venus, and was elongated in shape. The weather was very clear and quiet at the time of observation. The meteor's direction of flight was, approximately, from 270° + 40° to 221° - 7°.

SIR JOSEPH FAYRER, Sir Guyer Hunter, and Mr. Jonathan Hutchinson, the adjudicators, have (says the *British Medical Journal*) awarded a prize of fifty guineas to each of the following essays, sent in in response to the invitation of the Leprosy Fund: "On the history of the decline and final extinction of leprosy as an endemic disease in the British Islands," by Dr. George Newman; "On the conditions under which leprosy has declined in Iceland and on the extent of its former and present prevalence," Dr. Edward Ehlers (Copenhagen); "On the facts as to the recent increase of leprosy at the Cape and its present prevalence in South Africa," Dr. S. P. Impey (Medical Superintendent, Robbin Island); "On the reputed recent increase of leprosy on the Australian Continent; its extent and possible causes," Dr. Ashburton Thompson; "On the conditions under which leprosy prevails in China, Cochin China, Batavia, and the Malay Peninsula," Dr. James Cantlie (Hong Kong). On some of the subjects for which prizes were offered no essays were sent in, and some of the essays sent in were held not to meet the terms of the competition. The successful essays will be printed and published at the expense of the Fund.

ABOUT 11.15 on Sunday night, shocks of earthquake of varying intensity were felt over a considerable portion of Austria-Hungary, extending from Vienna to the Adriatic coast and the adjoining islands in one direction, and from Salzburg to Agram in another. In Vienna, according to the *Times* correspondent, the shocks were slight. Clocks were stopped, however, in parts of the town, and windows were heard to rattle. The vibrations are reported to have proceeded from south to north. The earthquake would seem to have reached its greatest intensity within a triangle formed by Laibach, Trieste, and Fiume. At Laibach no fewer than twenty-five shocks were noticed, and they continued until seven o'clock on Monday morning. The collections in the Laibach Museum are said to have been almost entirely destroyed. At Trieste several vibrations were felt, one of which was of ten seconds duration. Many buildings have been more or less damaged. Tremors of still longer duration are reported from Krainburg. Shocks of less violence occurred at Klagenfurt, Leibnitz, Luttenberg, Agram, and elsewhere. Four distinct vibrations were felt at Venice: the first, which took place at 11.17 p.m., was very severe, and lasted twelve seconds. Severe shocks of earthquake were also felt in Italy, at Ferrara, Udine, Treviso, and Padua.

WE have on various occasions given short descriptions in these pages of experiments carried on by different investigators with a view to discovering a practicable method of telegraphing over a considerable distance without metallic wires connecting the two stations. Among the observers who have devoted a considerable time to this problem may be mentioned Mr. Preece, the chief engineer of the Telegraph Department of the Post Office; and it is to this gentleman we owe the first practical application of the method of telegraphing by induction. During last week the submarine cable connecting Oban with Auchnacraig broke down, and the telegraphic messages have since been passed between these two places (distant about six miles) by means of Mr. Preece's inductive method. A gutta-percha insulated wire, one and a half miles long, was laid along the ground from Morven, whilst on the Island of Mull use was made of the ordinary overhead line connecting Craignure with Aros. The distance between the two parallel wires was about 3½ miles, the Sound of Mull being here at its narrowest. Using a vibrator as transmitter, and a telephone as receiver, the usual messages were successfully dealt with until the cable was repaired, the whole experiment forming a very interesting event in the annals of telegraphy.

A paper which will have considerable interest for those who have to design and use electrical apparatus, where wood or slate is often used as the insulator, appears in the *Proceedings* of the American Academy. The subject of the paper is the electrical resistance of certain poor conductors, such as wood and stone, and is by Mr. B. O. Peirce. The author has examined a great number of samples of different kinds of woods and stones under different conditions as to dryness, a most important point, and although, as might be expected, the individual results differ somewhat widely, he considers the mean results give a very fair idea of what may be expected in practice. The author has also tried the effect of soaking the different materials in hot melted paraffin, and finds in every case, especially if the specimen has been previously well dried, that such treatment not only increases the specific resistance, but by preventing the absorption of moisture prevents the falling off in the resistance otherwise observed when such bodies as stone or wood are exposed in a damp place. The following are some of the results for the specific resistance obtained in megohms; the first number denotes in each case the lowest value observed, and the second number the mean value:—Mahogany 310, 610; hard pine 17, 1050; white pine 360, 1470; vulcanised fibre 3, 60; slate 184, 280; white marble 2000, 8800. The samples of wood were all well seasoned, and the resistance was measured in the direction of the grain, the resistance across the grain being generally from 20 to 50 per cent. higher. The samples of stone were dried in the sun for about three weeks before being tested.

A simplified phonograph is described by A. Költzow in the *Centralzeitung für Optik und Mechanik.* A conical tracing point is used for recording the sound waves. This has the advantage of durability, and if it should wear out on one side, it need only be turned round its axis. The tracing-point is attached to one arm of a lever, the second and longer arm being provided with a membrane. For some purposes the membrane is replaced by a stretched string. The cylinders consist of a very hard soap. They will stand several hundred renderings. After use they can be turned down by 0·02 mm., so that one cylinder will suffice for 200,000 words.

In the *Comptes rendus* of the Paris Academy of Sciences of the 1st inst., as briefly stated in our abstract last week (p. 576), Prof. Mascart presented a note by the Abbé Maze, stating that in a collection of astronomical documents at the National Observatory, a register had been found containing thermometrical and other observations made by the astronomer I. Boulliau, between 25 May, 1658, and 19 September, 1660. Up to the present time, it was not known that observations had been made at Paris prior to those of Lahire. These observations are of some interest, being among the earliest thermometrical readings on the continent, and they fill up a gap in the climatological history of Paris. It is also noteworthy that the thermometer used was one of the Academy del Cimento.

A recent number of *Modern Medicine and Bacteriological Review* contains a notice of Dr. Pictet's interesting experiments on the application of intense cold as a therapeutic measure. According to this investigator's observations, calorific radiations of a lower temperature than − 65° pass through all the ordinary conductors of heat; a fur overcoat or a wooden board offering no more resistance than a pane of glass or other transparent medium to the passage of a sunbeam. Dr. Pictet experimented upon himself in a frigorific well, in which a temperature of − 100° C. to 110° C. was maintained. He was wrapped in warm clothes and thick furs, and at the end of four minutes he stated that he experienced intense hunger, which increased; after eight applications of eight or ten minutes duration his appetite became normal, and his digestion greatly improved.

The last number of the *Bolletino* of the Italian Geographical Society criticises the proposed nomenclature of some of the rivers of East Africa, as given in a sketch map in the *Geographical Journal* illustrating the explorations of the American traveller, Dr. Donaldson Smith. The names to which the Italian Society objects are those of Dr. Smith himself and of his English companion, Mr. Gillett, which have been applied to the upper and middle course of the Webi Shebeli and the Web respectively. We are bound to admit that the criticism is well-founded, as it is contrary to authorised usage to apply European names when the native names can be ascertained. We have little doubt that Dr. Smith will, before the end of his explorations, discover some features still unknown which may fitly be called after him and perpetuate the memory of his excellent geographical work.

Mr. H. Rutgers Marshall, whose work on "Pain, Pleasure, and Æsthetics" was reviewed in Nature (vol. l. p. 3), contributes to the April number of *Mind* an article, "Emotions *versus* Pleasure-Pain," in further elucidation of his views. Mr. Marshall is fully alive to the importance of evolutionary development, and his treatment of the emotions is therefore of interest to students of comparative psychology. It is unfortunate, however, that the term "instinct" is used in an extended sense which will scarcely be acceptable to those who approach the subject from the biological side. The phrases, "imitation impulse," "art impulse," "benevolent impulse," would appeal to them as more satisfactory than "imitation instinct," "art nstinct," &c., since they have grown accustomed to the application of the term instinct to the manifestation of particular activities. But a consensus of opinion on psychological nomenclature seems at present impossible. And in any case, Mr. Marshall's views are well worthy of careful consideration.

An experiment of considerable interest in connection with the transmission of optical signals has been performed by M. Charles Henry at the Depôt des Phares. The question was whether rhythm in a succession of signals increases or diminishes their visibility? This was solved by means of a revolving drum, the surface of which contained sixty holes illuminated by a source of light placed at the axle. The drum was 3 feet across, and was driven by clockwork. By varying the speed of the drum and the brightness of the light, and by closing some of the holes at regular or irregular intervals, all the conditions of the experiment could be varied at pleasure. The chief difficulty in this, as in most physiological experiments, lay in bringing the eye back to its original state after each experiment. It was sometimes found impossible, even after keeping in the dark for close upon half an hour, to restore the observer's eye to its original state of sensibility. But it was conclusively shown that it is possible to increase the range through which an optical signal will carry by arranging the succession of flashes according to a sufficiently complex non-rhythmical law.

Probably no better example of an invention borrowed or adapted from nature could be found than is afforded by the sand-blast. As is well known, the invention, now a quarter of a century old, consists of a stream of sand or other abrasive powder, usually dry, but sometimes mixed with water, projected with more or less force and velocity to strike and pulverise the surfaces of glass, stone, metal, and other materials upon which it is directed. The many applications of this method of abrasion were recently described by Mr. J. J. Holtzapffel, at the Society of Arts. It appears that glass is almost immediately depolished by the blasts now in use, and but a comparatively short time is required to pierce and cut apertures through sheet and plate glass. Stone, marble, slate, and granite are just as amenable to the action of the sand-blast. Iron, steel, and other metals have their surfaces easily reduced, and smoothly or coarsely granulated, according to the force and abrasive powder used. It is remarkable that it is by no means necessary that the abrasive be harder than the material to which it is applied; thus, hardened steel and corundum are readily pierced with sand. The blast is not only in use for producing a uniform granulation on sheet glass; it is also employed for frosting the bubbles of incandescent lamps and the like; for the decoration of glass ware, and the labelling of graduated measures. In metal, the hard scale, so destructive to cutting tools, is removed from castings and forgings by the blast. On stone, slate, and granite the sand-blast is used for incised carving and inscriptions in intaglio or relief, and for delicate drawing for lithography. A print of a child's head, exhibited by Mr. Holtzapffel, was an astonishing example of the delicacy of treatment obtainable by the process. Among other purposes, the blast is employed for removing fur and deposits in tubes and tanks; for cleaning off accumulations of paint and dirt within iron ships; for decorating coat and other buttons; for piercing the apertures in glass ventilators; for marking pottery, and in the manufacture of ornamental tiles; for refacing grindstones, emery, and corundum wheels; for granulating celluloid films for photography; and on wood, to bring out the grain in relief, and, latterly, for blocks for printing. These many and various applications of sand-blast processes show that the art has developed in an extraordinary manner since it was introduced by Mr. Tilghmann in 1870.

DR. H. WILD has published, in the *Zapiski* of the St. Petersburg Academy of Sciences, a very important investigation, entitled "New Normal Air-Temperatures for the Russian Empire." In a former paper upon this subject, the data for the monthly, yearly, and five-yearly means were brought down to the year 1875, while in the present work observations have been included to the year 1890, and comprise materials from no less than 575 stations, of which 244 are new.

THE additions to the Zoological Society's Gardens during the past week include an Irish Stoat (*Putorius hibernicus*) from Ireland, presented by Viscount Powerscourt; a Grey Parrot (*Psittacus erithacus*) from West Africa, presented by Mr. A. A. Dowty; a Cape Viper (*Causus rhombeatus*) from South Africa, presented by Mr. J. E. Matcham; two Elephantine Tortoises (*Testudo elephantina*) from the Aldabra Islands, Seychelles; four Indian Pythons (*Python molurus*) from India, deposited; a Barbary Wild Sheep (*Ovis tragelaphus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

LUNAR RIVER BEDS AND VARIABLE SPOTS.—The highly favourable atmospheric conditions at Arequipa have enabled Prof. W. H. Pickering to make numerous observations which have a special bearing on the question of the existence of water on the moon (*Annals Harvard College Observatory*, vol. xxxii. part 1). In addition to the ordinary rills, Prof. Pickering has catalogued thirty-five narrower ones, which, from their resemblance to terrestrial watercourses, he does not hesitate to regard as "river beds." These are wider at one end than at the other, and the wide end always terminates in a pear-shaped craterlet. Most of them are only a few miles in length, and a few hundred feet in width at the widest part, and, except when very deep, they are very difficult objects. The largest and most readily observed has its origin in the Mount Hadley range in the Apennines; its course lies a little north of west, and its total length is about sixty-five miles. There does not appear to be any reason to suppose that these formations actually contain water at the present time, but Prof. Pickering brings forward other evidence in favour of the presence of a small amount of moisture on the lunar surface.

Certain variable dark spots have been detected in different regions, many of them lying inside craters, others symmetrically surrounding craterlets, and others in the dark *maria*, or "seas." In the central craters, such as Alphonsus, the spots are darkest just after full moon, when shadows are geometrically impossible, and they are invisible when the shadows are strongest. "If called upon to offer an explanation of the phenomenon, we seem forced to call in the aid of water as an active agent." Still, the dark spots cannot be simply ponds, as one of the spots in Alphonsus for a portion of the time covers and darkens the slopes of a small hill near the crater-wall. "This seems to effectually overthrow the hypothesis of a free liquid surface, as well as the suggestion that the dark colouration may be due to frozen ground that has partially thawed. . . . Vegetation would undoubtedly explain away all our difficulties; but before we resort to such an extremity, it is evident that we need more facts upon which to base our theories."

The Mare Tranquilitatis is said to be almost covered by these variable spots, and Prof. Pickering states that the changes may be seen with the smallest telescope, or even with the naked eye; until past first quarter this area is lighter than the Mare Crisium; it then rapidly becomes the darker of the two until after full moon, when it again becomes lighter.

The changes in some of the spots are readily seen in the beautiful photographs which illustrate the memoir.

THE ULTRA-VIOLET SPECTRUM OF THE CORONA.—With spectroscopes in which the optical parts are made of glass, it is only possible to photograph the spectrum in the ultra-violet as far as wave-length 360; but when the spectroscopic train consists of quartz and Iceland spar, a more refrangible region is open to investigation. One of the spectroscopes employed in Africa by M. Deslandres during the total eclipse of the sun on April 16, 1893, was of the latter form, and a plate exposed for four minutes gives for the first time some information as to the coronal spectrum in the extreme ultra-violet (*Comptes rendus*, April 1). The slit of the spectroscope cut the image of the corona along the equatorial diameter, and to facilitate the reduction of wave-lengths, the spark-spectrum of iron was photographed on the same plate. The photograph shows the spectrum of the corona to consist of bright lines superposed on a continuous spectrum. In the blue, the continuous spectrum reaches a height equal to two-thirds the sun's diameter, but it diminishes both in height and intensity until about λ 300 it is almost reduced to zero. Forty lines are tabulated from λ 308 to λ 362; one at λ 3170·9 appears to reach a great height in the solar atmosphere, and others at λ 3164·5, 3189·5, and 3237·1, are comparable with the hydrogen lines H_δ, H_ϵ, and H_ζ. The remaining lines may belong either to the chromosphere or corona; but M. Deslandres considers the fact that they are shown with a small image on the slit, to be in favour of the view that they are coronal. Most of the lines cannot be identified with known substances, and they probably represent gases of low atomic weight.

STELLAR PARALLAXES.—A very suggestive investigation of stellar parallaxes in relation to magnitudes and proper motions, has been carried out by Mr. T. Lewis (*Observatory*, April). The parallaxes adopted are the means of the values obtained by various observers, and from these the velocities across the line of sight have been derived by dividing the proper motions by the parallaxes and reducing to miles per second. The conclusions suggested by the tables given are: "(1) Leaving out a few of the brightest stars, the parallaxes are constant down to 2·7 magnitude. (2) After 2·7 mag. is reached, the parallaxes are doubled and remain practically constant to 8·4 mag. (3) Up to the 3rd mag. the velocities are very small, averaging about 9 miles per second, while after the 3rd mag. the velocity is 38 miles per second." It seems probable that in our immediate neighbourhood there are a few stars of exceptional brilliancy (about 8) and a few smaller stars, of which nearly 40 are at present known; while stars of mag. 1 to 3 are as a class far outside this inner space, and have very small velocities. The investigation confirms the accepted idea that a measurable parallax accompanies a large proper motion, and shows, further, that this holds good whatever the magnitude of the star may be.